

spirals. The laws (13, 14) that govern the common system apply equally to any other. The mode of finding the cycle from the secondary spirals (15, 16) is also the same as in the common system.

28. The phyllotaxis of the leaves is generally uniform in the same species. Thus in the Oak the leaves are always alternate; in the Maple, they are always opposite; and in *Galium* always whorled. The cycle of the cone of Hemlock Spruce is always 5-13. The direction of the spirals does not appear to be uniform in the same species, but, in some individuals the spiral winds to the right, and in others it winds to the left. In the same individual plant, the spiral usually pursues the same direction upon the branches as upon the stem.

FLOWERS AND SNOW.—This season of the year calls to mind some observations concerning flowers and snow in Colorado.

Among the first flowers of spring, those that must live and bloom through many snow storms, are *Townsendia scirica*, *Sisymbrium canescens*, *Cymopterus glomeratus* and *montanus*, *Viola Nuttallii*, *Leucocrium*, *Corydalis*, *Thlaspi*, &c. Last year the *Townsendia* was in blossom as early as Feb. 14th, and *Phlox canescens*, with many other flowers, by the middle of March. A number of plants are in bloom in April and covered every year by the spring snows. In May I have seen *Cratægus coccinea* white with flowers made still whiter by the damp snow, with *Astragalus* and *Vicia* and very many other plants in full bloom buried beneath a foot of snow.

The spring snows do not seem to injure the plants or flowers in the least and many of them are benefited by the increase of moisture.

A snow storm in June is said to have covered all the dry parks with sunflowers, *H. petiolaris* and *lenticularis*. The alpine plants growing where there is a frost nearly every night in the year, must be well able to stand the cold. In July I once saw a *Trollius latus* in blossom, growing out from a hole about one foot in diameter, in the center of a large snow drift. As the snow drifts disappear the plants rapidly grow and blossom. Some of the drifts melt away much sooner than others, and plants growing there are much in advance of those inhabiting the place of late melting snows. On Mt. Ouray, above timber line, there is a slope which, in August, is beautifully covered with the large golden flowered *Ranunculus adoneus*. On one portion from which the snow early melted, the plants are almost out of flower; at another part they are in their greatest perfection, and in other parts they are in their youth, closely following up the retreating snow drift.

Late one September, after snow had fallen twice, I made two or three excursions up among the high summits of the Sierra Sangre de Cristo, and was surprised to find a great number of plants in blossom in shaded locations and under rocks where the snow had not melted away early enough in the summer so as to give them a good start. They seemed bound to live their life out even if they did have a hard time of it and it took a longer time than all summer. *Primula Parryi*, frozen in blossom, was growing under cascades among ice-covered rocks. *Aquilegia carulea* full of flowers, was standing in snow. *Adoxa*, *Gentiana frigida*, *Erigeron*, *Saxifraga* and many others were caught in full bloom by the Alpine winter. During some winters an extraordinary amount of snow falls and drifting among the high peaks, the following summer may not be long enough and warm enough to uncover the plants growing beneath, and they may not even begin to grow that year. After a winter of little snow and small drifts soon melted away by a warm summer, barren ground that may not have seen light upon it for years, is uncovered and an ancient drift has a wide border of flowerless ground.—T. S. BRANDEGEE.

THE DISTRIBUTION OF THE NORTH AMERICAN FLORA, by Sir J. D. Hooker.—In the *American Naturalist* for March there is a reprint of this lecture delivered by Sir J. D. Hooker last spring before the members of the Royal Institution of Great Britain. It will be remembered that the lecturer visited the United States during the summer of 1877, and in connection with Dr. Gray made a botanical cross-section of the continent, noting particularly the geographical distribution of plants. The regular report of this survey will appear in the forthcoming eleventh report of the U. S. Geol. and Geog. Survey of the Territories, and until that report is ready for distribution we will have to be satisfied with such casual information as the distinguished authors choose to give us.

The lecture begins by stating the fact of the immigration of plants from one continent to another, and then proceeds at once to a consideration of the physical conformation of America and the effect it has had upon the distribution of plants.

In the United States the lecturer observes five well defined meridional belts of vegetation, viz: the great eastern forest region, extending from the Atlantic to beyond the Mississippi; the prairie region; the Rocky Mountain region; the Sink region, remarkable for its display of sage-bush and saline plants; and the Sierra Nevada region with its gigantic coniferous forests. The first region is very closely